Claims

1. An apparatus for measuring alternating current in a conductor, the apparatus comprising first and second coil means having substantially the same turns-area product and substantially parallel axes, the first and second coil means being located on the circumference of a notional circle with the first coil means having its axis tangential to the circle and the second coil means having its axis extending radially of the circle, and third and fourth coil means also having substantially the same turns-area product and substantially parallel axes, the third and fourth coil means being located on the circumference of the notional circle close to the first and second coil means respectively, the third coil means having its axis extending radially of the circle and the fourth coil means having its axis tangential to the circle such that the first and third coil means form a closely adjacent first pair of coil means with substantially orthogonal axes and the second and fourth coil means form a closely adjacent second pair of coil means with substantially orthogonal axes, the first to fourth coil means being mounted on a support means configured to allow a conductor to be introduced into the centre of the said circle with the axis of the conductor normal to the plane containing the first to fourth coil means, the apparatus further including means electrically connecting the first and second coil means in series in anti-phase and the third and fourth coil means in series in anti-phase, and means for deriving the alternating current in the conductor as a function of the voltages induced in the series-connected first and second coil means and the series-connected third and fourth coil means.

2. An apparatus as claimed in claim 1, further comprising fifth and sixth coil means having substantially the same turns-area product and substantially parallel axes, the fifth and sixth coil means being located on the circumference of a second notional circle concentric with, and having a diameter greater than, the first notional circle, the fifth coil means being located radially outwardly of the first coil means and having its axis tangential to the second circle and the sixth

coil means being located radially outwardly of the second coil means and having its axis extending radially of the second circle, and seventh and eighth coil means also having substantially the same turns-area product and substantially parallel axes, the seventh and eighth coil means being located on the circumference of the second notional circle close to the fifth and sixth coil means respectively, the seventh coil means having its axis extending radially of the second circle and the eighth coil means having its axis tangential to the second circle such that the fifth and seventh coil means form a closely adjacent third pair of coil means with substantially orthogonal axes and the sixth and eighth coil means form a closely adjacent fourth pair of coil means with substantially orthogonal axes, the apparatus further including means electrically connecting the fifth and sixth coil means in series in anti-phase and the seventh and eighth coil means in series in anti-phase, the means for deriving the alternating current in the conductor deriving said current as a function of the voltages induced in the series-connected first and second coil means, the series-connected third and fourth coil means, the series-connected fifth and sixth coil means, and the series-connected seventh and eighth coil means.

3. An apparatus as claimed in claim 1 or 2, wherein each pair of orthogonal coil means has a substantially identical pair of orthogonal coil means located symmetrically on the diametrically opposite side of the centre of the first notional circle and having the same orientation as its symmetrical counterpart, each coil means and its symmetrical counterpart being connected in series in the same phase.

4. An apparatus as claimed in any preceding claim, wherein all the coil means have substantially the same turns-area product.

5. An apparatus as claimed in claim 4, wherein the turns-area product of all the coil means are the same to within 1%.

6. An apparatus as claimed in any preceding claim, wherein each coil means is formed as conductive coil-forming tracks on at least one insulating substrate and the support means comprises an insulating motherboard, the substrates standing upright on the board and the coil-forming tracks on the substrates being connected by conductive tracks on the motherboard.

7. An apparatus as claimed in claim 6, wherein at least one pair of orthogonal coil means comprises a first insulating substrate bearing a first coil-forming track defining one of said pair of orthogonal coil means and second and third insulating substrates disposed substantially normal to the first substrate and bearing second and third coil-forming tracks respectively, the second and third coil-forming tracks being connected together in series and together defining the other of said pair of orthogonal coil means.

8. An apparatus as claimed in claim 7, wherein the second and third coil-forming tracks have a combined turns-area product substantially the same as the first coil-forming track.

9. An apparatus as claimed in claim 6, 7 or 8, wherein at least two coil-forming tracks are formed on a common substrate.